—*Ça ira.*" It was no doubt this "great sensation" that provoked Gillray's cartoon.

But who the lecturer may be would be a matter of small importance except for the circumstance that Prof. Cohen devotes much of his space to a somewhat laboured commentary on the print.

The caricature constitutes, in fact, as he explains in his preface, the *motif* of his little book—a fascimile reproduction of it is given as the frontispiece—and it was the chief inducement which led him to put together at such length the *histoire intime* of laughing-gas.

Such a book is probably not intended to be a serious contribution to historical chemistry. From the fact that it is dated from Zandvoort-Bad in the August of last year—that "summer of drear and dour, implacable rain"—we incline to the opinion that it was a holiday occupation imposed by the tedium of a particularly dolorous time.

With the aid of much "process work" and a wealth of classical allusion, Dr. Cohen has managed to pack within the compass of 100 pages the results of a considerable amount of bibliographical research on matters of no very great importance. Like the famous Cid Hamet, he is the most diligent searcher after the minutest circumstances, "even to the very atoms of his true history," and everything relating to laughing-gas—at least as regards its *histoire intime*—is set down with the most painstaking particularity. The history opens with Mitchill in America and his "oxide of Septon," passes on to Beddoes of Bristol and his Pneumatic Institution; the engagement there of Davy, and his discovery of the physiological effect of the respiration of nitrous oxide, which he prepared by the decomposition of ammonium nitrate in the manner first described by Berthollet and La Place, and, apparently independently, by Deiman and Paets van Troostwijk. There is, of course, no reason why chemistry should not have its Captain Gronow or its Greville memoirs, and, incidentally, Prof. Cohen has much to say of the personal history of certain of those whose names are connected, however slightly, with the *histoire intime* of nitrous oxide. The manner, for example, in which he runs his countryman Adriaan Paets van Troostwijk to earth is characteristic of your born commentator.

Davy's rhapsodical description of his sensations on breathing nitrous oxide is naturally given at length. Next we have a series of portraits, with here and there slight personal touches, of distinguished individuals who have breathed nitrous oxide, or who have seen others breathe it. They range from Southey and Coleridge in England to Fourcroy, Vauquelin, Thénard, Orfila, and Proust in France, and Pfaff and Wurzer in Germany. Indeed, the wealth of pictorial illustration of the *histoire intime* of nitrous oxide which Dr. Cohen's industry and perseverance have enabled him to accumulate is quite remarkable. The only omission we have been able to discover is a representation of a dentist's chair.

Davy's connection with the place, together with Gillray's caricature, is, of course, the main reason why Prof. Cohen devotes so much of his space to the early history of the Royal Institution, which *pace* Gillray and the symposium already referred to had very little to do with laughing-gas. To what extent the gas entered into its history may be seen from Pictet's lively account, published in 1802. Dr. Cohen, as becomes the true commentator, displays much erudition and no small amount of acumen in expounding the true inwardness of Gillray's drawing. The meaning is not very cryptic, after all. According to our author, the caricature must be regarded as directed against Rumford; it is, in fact, a satire on the Count, and incidentally on the Institution which he founded. Possibly this surmise is true, but the manner in which it is reached is even more humorous than the cartoon itself. So far as we are aware, no one has been at the pains to put forward any other interpretation—certainly none which would conflict with the view which Prof. Cohen has taken, and we are therefore content to be of his opinion, since "'tisn't worth while, it would seem, to dispute, when we know the result immaterial."

We congratulate Prof. Cohen on his interesting brochure. It is an elaborate trifle which may serve to beguile and amuse the tired researcher in his hours of ease. But if the *histoire intime* of chemical compounds, in general, say even of such things as arsenic, prussic acid, calomel or Epsom salts, were to become fashionable, what a literature we should have!

TRITUBERCULISM.

Evolution of Mammalian Molar Teeth, to and from the Triangular Type. (Biological Studies and Addresses, vol. i.) By H. F. Osborn; edited by W. K. Gregory. Pp. ix+250; illustrated. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1907.)

A QUARTER of a century ago next April, the late Prof. E. D. Cope, struck by the remarkable fact that the molar teeth, both upper and lower, of all the mammals from the Puerco or lowest Eocene horizon of North America carry three cusps arranged in triangular form, proposed what was practically the germ of the now well-known tritubercular theory. Briefly stated, this theory is to the effect that in the ancestors of all existing mammals each upper molar carried a triangle of cusps with the apex pointing inwards, while the corresponding lower teeth had a similar triangle with the apex directed outwards; and that from this primitive type have been evolved all the various modifications of molar structure, in most cases by the addition, but in certain instances by the subtraction, of cusps. The exponent, and to a great degree author, of the theory in its present form is Prof. Osborn, who has done well in laying before the scientific world the evidence for and against this fascinating doctrine.

For it has to be acknowledged that while the tritubercular theory was received with acclamation when first promulgated in its full development by the author of the volume now before us, there has of late years been a certain reaction in this respect as the result

© 1908 Nature Publishing Group

of hostile criticism and alternative hypotheses furnished by anatomists and microscopists of great scientific repute. Prof. Osborn is, however, fully convinced of the ultimate triumph of the theory; and, indeed, goes so far as to state that, in his opinion, "the evidence in favour of it is so overwhelming that primitive trituberculy is no longer an hypothesis or a theory, but an established fact."

That a theory, although established on what appears to be a firm basis of fact, may require revision in certain details is a matter of everyday experience, and our author is fully prepared to admit such emendations in this particular case so soon as the necessity can be proved to be imperative. One of the points against which criticism has been concentrated is the author's view that the apex of the triangle in both the upper and the lower molars represents the single cone of the ancestral reptilian tooth. In the case of the lower teeth, embryological evidence coincides with Prof. Osborn's theoretical view; but as regards the upper molars the testimony of embryology points to the conclusion that, at least in many groups, the antero-external, in place of the internal, is the primitive element. The author meets this and other objections by the candid statement that the five great principles on which the theory was originally based "do not stand or fall together"; one or more may go, or have to be modified, without imperilling the hypothesis as a whole; and even if the cusps ultimately prove not to be strictly homologous with one another in different groups, "the homological nomenclature should be retained for convenience because it has found its way so largely into literature."

The homology and origin of the cusps are, however, by no means the sole object of attack on the part of critics. Among other objections, reference may be made to the multitubercular theory, according to which molars have tended to simplify rather than to grow more complex. This hypothesis is met by the author, and we think rightly, with a direct negative, and certain other objections receive equally summary treatment.

As regards the plan of the work, it is important to notice that the contents are in the main formed by separate papers on trituberculism, which have been arranged in chronological order, and, where necessary, brought up to date by intercalary notes. This plan has its advantages and disadvantages. Its advantages are that the history of the controversy is easy to follow, while the disadvantages are manifest in the shape of a considerable amount of repetition. We are also left in doubt at the end of the volume as to what the author's present views really are with regard to several points on which his theory has been challenged.

To do anything like justice to the work demands much more space than can be given to it in this notice. All that can be done is therefore to direct attention to its importance and interest, and at the same time to express the opinion that the author has succeeded in placing trituberculism on a much more secure and unassailable basis than it ever previously occupied.

R. L.

OUR BOOK SHELF.

Nature and Development of Plants. By C. C. Curtis. Pp. v+471. (New York: Henry Holt and Co., 1907.)

THE author of this book has set himself a definite task, namely, to give an account of plant life, with special reference to that aspect which presents it as a working organism. Dr. Curtis is to be congratulated on the success with which he has achieved his object, for he has produced an excellent and readable book which may be confidently recommended for the use of junior classes in this country. Naturally, some of the actual examples may prove unfamiliar to the student, but the majority of the plants chosen for illustration are readily accessible to all.

The "nature of the plants" occupies the first part of the book, and it is this portion which strikes us as especially good. The second part is devoted to the development, meaning thereby the phylogenetic classification of the vegetable kingdom; and here again Dr. Curtis has, we think, contrived to sustain the interest in a branch of botany which, as treated in elementary works, is often intolerably dull. He has introduced a certain amount of advanced work in this part of the book, though with a judicious absence of unnecessary detail.

Perhaps a degree of emphasis, rather greater than is warranted by our knowledge, is laid on the relation between alternation of generations and chromosome reduction. The discussion also as to the meaning of unit characters and the method of their inheritance strikes us as too formal and dogmatic to be very useful. But these are small blemishes in a work where there is so much that merits praise.

The numerous and excellent illustrations form a distinct feature of the book, but we note two amongst them which might well be replaced. Fig. 43, and the text which accompanies it, represent a very diagrammatic and not very normal mode of secondary thickening, whilst Fig. 85 certainly ought to be redrawn. A seedling castor-oil plant is not the furry object there represented.

J. B. F.

The Diseases of Animals. By Nelson S. Mayo. Third edition. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1907.) Price 6*s.* 6*d.* net.

THIS work, which purports to be one of popular advice on the care and common ailments of farm animals, is written entirely from the American point of view, and deals with American methods principally, in most distinctly American orthography. It cannot be doubted that its usefulness to the British rural public, not less than the pleasure of reading it, are considerably lessened thereby. It is decidedly irritating to readers on this side of the Atlantic to see such abominations as "sulfur," "esophagus," "sulfate," "mold," and others of a similar kind. There is, nevertheless, a good deal of useful and practical information on the care of animals and farm stock which the farmer would do well to know, no matter in what part of the world he carries on his occupation. In fact, that portion of the book which deals with feeding, watering, exercise, and the hygienic care of domestic animals, both stock and pets, is in our opinion by far the most useful to the general reader. In this section dogs, cats, rabbits, hares, guinea-pigs, and poultry are dealt with, in addition to the farm animals proper.

The photographic illustrations of the animals themselves are good, but some of those representing morbid conditions are of little value, for example, that of tuberculosis of the lung (p. 380), which could give no assistance to the non-expert.

In a work of this kind it is doubtless difficult to

© 1908 Nature Publishing Group